

Application No. 10/779,552
Amendment dated March 21, 2005
Reply to Office Action dated October 20, 2004

AMENDMENT TO THE SPECIFICATION

Please replace paragraph [0012] with the following amended paragraph:

[0012] Highly beneficial results are achieved if the first solution also includes one or more catalysts such as an amine based catalyst or a metallic based catalyst. Suitable amine based catalysts are ~~Polyeat~~ POLYCAT[®] 33, Polyeat POLYCAT[®] 5, Polyeat POLYCAT[®] BL 22, Polyeat POLYCAT[®] LV 33, Polyeat POLYCAT[®] 18 and Polyeat DABCO[®] 8154 amine based catalysts, which are available from Air Products ~~Company~~ and Chemicals, Inc., as well as ~~Niax~~ NIAX[®] A-33 amine based catalyst, which is available from O Si Specialities, Inc. A suitable metallic based catalyst is ~~Dabco~~ DABCO[®] K-15 metallic based catalyst, which is available from Air Products and Chemicals, Inc.

Please replace paragraph [0013] with the following amended paragraph:

[0013] Excellent results are obtained if the first solution also includes an effective amount of one or more surfactants. Surfactants which have been employed with success are DC 193, DC 195, DC 197, DC 198, DC 5000 and DC 5598 surfactants, which are available from Dow Corning, as well as ~~Niax~~ NIAX[®] L620 and Niax NIAX[®] L-6900 surfactants, which are available from O Si Specialities, Inc.

Please replace paragraph [0014] with the following amended paragraph:

[0014] It is also especially advantageous if the first solution also includes an effective amount of one or more fire retardants. Suitable fire retardants are ~~Antiblaze~~

ANTIBLAZE N, Antiblaze ANTIBLAZE 80, and Vireol VIRCOL[®] 82 fire retardants, which are all available from Rhodia.

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Please replace paragraph [0015] with the following amended paragraph:

[0015] According to the process of the present invention, a second solution is provided which includes one or more isocyanates. The one or more isocyanates may be monomeric organic isocyanates, polymeric organic isocyanates, or inorganic isocyanates. Isocyanates which have been beneficially employed are ~~Rubinate~~ RUBINATE[®] M (polymeric, NCO content = 31.5%, functionality = 2.7); ~~Rubinate~~ RUBINATE[®] TDI (NCO content = 48.3%, functionality = 2.0); toluene diisocyanate (TDI); methylene diisocyanate (MDI); ~~Papi~~ PAPI[®] 94; and ~~Papi~~ PAPI[®] 27, all of which are available from Huntsman Polyurethanes.

Please replace paragraph [0020] with the following amended paragraph:

[0020] One hundred sixty-eight (168) grams of pyromellitic dianhydride (PMDA) were dissolved in two hundred forty (240) grams of N, N-dimethyl formamide (DMF) at approximately 210° F. The solution was held at temperature and stirred until the PMDA was fully dissolved and the solution became clear. The solution was then cooled to approximately 175° F. Once cooled, twenty (20) grams of methanol were added to the solution and stirred. The addition of the methanol produced an exothermic reaction, which increased the temperature of the solution by approximately 25° F. This solution was again cooled, this time to approximately 120° F. A second solution consisting of twenty (20) grams of water, thirty-four (34) grams of surfactant (DC 193), 0.06 grams of catalyst (~~DABCO[®]~~ K-15) catalyst, 0.03 grams of catalyst (~~POLYCAT[®]~~ BL 22) catalyst, 12.5 grams of ethylene glycol (E-600), and 8.6 grams of ~~phosphorous-based fire retardant~~ (~~Antiblaze~~ ANTIBLAZE N) phosphorus based fire retardant, was prepared concurrently.

This second solution was stirred at room temperature. This second, room temperature solution was poured into the 120° F DMF solution and the mixture was stirred for several minutes. The combined solution was again cooled, this time to approximately 100° F. Once cool, 27.4 grams of ~~Rubinate~~ RUBINATE[®] M isocyanate was added to 48.4 grams

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of the DMF solution. The remainder of the DMF solution was cooled to room temperature and stored for later use and given the designation 030403. The combined DMF solution and ~~Rubinate~~ RUBINATE[®] M mixture was vigorously stirred with a high speed mixer (about 2000 rpm) for approximately 5-20 seconds. The contents, which began to rise/foam at this point, was immediately transferred to a Pyrex dish where it was allowed to rise at ambient conditions. Once the foam was no longer tacky and was somewhat rigid (about 10 minutes), it was placed in a conventional 1200-watt microwave oven and cured on high for nine minutes. The resultant foam was bright yellow in color and very tough with a density of 0.35 pcf. DSC measurements of the resultant foam indicated full imidization of the material.

Please replace paragraph [0021] with the following amended paragraph:

[0021] Two hundred forty-eight (248) grams of 3, 3', 4, 4' bezophenone tetracarboxylic dianhydride (BTDA) were dissolved in two hundred forty (240) grams of N, N-dimethylformamide (DMF) at approximately 250° F. The solution was brought to a boil and stirred for approximately fifteen minutes. The partially dissolved solution was then cooled to approximately 180° F. Once cooled, twenty (20) grams of methanol were added to the solution and stirred. The addition of the methanol produced an exothermic reaction that increased the temperature of the solution by approximately 25° F. The addition of the methanol produced a fully dissolved, clear solution. This solution was again cooled, this time to approximately 120° F. A second solution consisting of twenty (20) grams of water, thirty-four (34) grams of surfactant (DC 193), 0.2 grams of catalyst

~~(DABCO[®] K-15) catalyst, 0.02 grams of catalyst (POLYCAT[®] BL 22) catalyst, 12.5 grams of ethylene glycol (E-600), and 8.6 grams of phosphorous-based fire retardant (Antiblaze ANTIBLAZE N) phosphorous based fire retardant,~~ was prepared concurrently. This second solution was stirred at room temperature. The second, room temperature solution was poured into the 120° F DMF solution and stirred for several minutes. The combined solution was again cooled, this time to approximately 100° F.

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Once cool, 26.9 grams of ~~Rubinate~~ RUBINATE[®] M isocyanate was added to 56.1 grams of the DMF solution. The remainder of the DMF solution was cooled to room temperature and stored for later use and given the designation B030303. The combined DMF solution and ~~Rubinate~~ RUBINATE[®] M mixture was vigorously stirred with a high speed mixer (about 2000 rpm) for approximately 5-20 seconds. The contents, which began to rise/foam at this point, was immediately transferred to a Pyrex dish where it was allowed to rise at ambient conditions. Once the foam was no longer tacky and was somewhat rigid (about 10 minutes), it was placed in a conventional 1200-watt microwave oven and cured on high for nine minutes. The resultant foam was dark amber in color and very tough with a density of 0.35 pcf. DSC measurements of the resultant foam indicated full imidization of the material.

Please replace paragraph [0022] with the following amended paragraph:

[0022] Two hundred twenty-six (226) grams of 3, 3', 4, 4'-biphenyltetracarboxylic dianhydride (BPDA) were dissolved in two hundred forty (240) grams of N, N-dimethylformamide (DMF) at approximately 250° F. The solution was brought to a boil and stirred for approximately fifteen minutes. The partially dissolved solution was then cooled to approximately 180° F. Once cooled, twenty (20) grams of methanol were added to the solution and stirred. The addition of the methanol produced a slight exothermic reaction that increased the temperature of the solution by approximately 10°

F. However, in this case the addition of the methanol did not produce a fully dissolved, clear solution. The DMF/methanol mixture was again heated to 195° F and stirred for an additional fifteen minutes. The BPDA did not completely dissolve and the resultant mixture was cloudy. The solution was then cooled to approximately 120° F. A second solution consisting of twenty (20) grams of water, thirty-four (34) grams of surfactant (DC 193), 0.04 grams of ~~catalyst~~ (Dabco DABCO K-15) ~~catalyst~~, 0.04 grams of ~~catalyst~~ (POLYCAT[®] BL 22) ~~catalyst~~, 12.5 grams of ethylene glycol (E-600), and 8.6 grams of ~~phosphorous-based fire retardant~~ (~~Antiblaze~~ ANTIBLAZE N) ~~phosphorous-based fire~~

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retardant, was prepared concurrently. This second solution was stirred at room temperature. The second, room temperature solution was poured into the 120° F DMF mixture and stirred for several minutes. The combined solution was again cooled, this time to approximately 100° F. The combined mixture was cloudy white in color. Once cool, thirty (30) grams of ~~Rubinate~~ RUBINATE® M isocyanate was added to forty-five (45) grams of the DMF solution. The remainder of the DMF solution was cooled to room temperature and stored for later use and given the designation BP03603. The combined DMF and ~~Rubinate~~ RUBINATE® M mixture was vigorously stirred with a high speed mixer (about 2000 rpm) for approximately 5-20 seconds. The contents, which began to rise/foam at this point, was immediately transferred to a Pyrex dish where it was allowed to rise at ambient conditions. Once the foam was no longer tacky and was somewhat rigid (about 5 minutes), it was removed from the Pyrex dish and placed directly in a conventional 1200-watt microwave oven and cured on high for nine minutes. The resultant foam was dark yellow in color and somewhat brittle with a density of 0.94 pc/f. DSC measurements of the resultant foam indicated full imidization of the material.

Please replace paragraph [0023] with the following amended paragraph:

[0023] An equal molar solution of pyromellitic dianhydride (PMDA) and 3, 3', 4, 4' bezophenone tetracarboxylic dianhydride (BTDA) was prepared by mixing 24.7 grams of solution 030403 from Example 1 and 28 grams of solution B030303 from Example 2. The mixture was stirred at room temperature for approximately five minutes. At room temperature, 27.4 grams of ~~Rubinate~~ RUBINATE® M isocyanate was added to the 52.7 grams dianhydride mixture/DMF solution. This mixture was vigorously stirred with a high speed mixer (about 2000 rpm) for approximately 5-20 seconds. The contents, which began to rise/foam at this point, was immediately transferred to a Pyrex dish where it was allowed to rise at ambient conditions. Once the foam was no longer tacky and was somewhat rigid (about 10 minutes), it was removed from the Pyrex dish and placed directly in a conventional 1200-watt microwave oven and cured on high for nine minutes.

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The resultant foam was dark yellow in color and very tough with a density of 0.59 pcf. DSC measurement of the resultant foam indicated full imidization of the material.

Please replace paragraph [0024] with the following amended paragraph:

[0024] Eighty-four (84) grams of pyromellitic dianhydride (PMDA) were dissolved in one hundred twenty (120) grams of N, N-dimethylformamide (DMF) at approximately 210° F. The solution was held at temperature and stirred until the PMDA was fully dissolved and the solution became clear. The solution was then cooled to approximately 175° F. Once cooled, five (5) grams of methanol and five (5) grams of acetone were added and the solution was stirred. The addition of the methanol/acetone produced an exothermic reaction, which increased the temperature of the solution by approximately 15° F. This solution was cooled to approximately 120° F. A second solution consisting of ten (10) grams of water, seventeen (17) grams of surfactant (DC 193), 0.01 grams of ~~catalyst (Dabco DABCO K-15) catalyst~~, 0.01 grams of ~~catalyst (POLYCAT® BL 22) catalyst~~, 6.3 grams of glycol (E-600), and 4.3 grams of ~~phosphorous-based fire retardant~~

~~(Antiblaze ANTIBLAZE N)~~ phosphorous based fire retardant, was prepared concurrently. This second solution was stirred at room temperature. This second, room temperature solution was poured into the 120° F DMF solution and stirred for several minutes. The combined solution was again cooled, this time to approximately 100° F. Once cool, 27.4 grams of ~~Rubinate RUBINATE® M isocyanate~~ was added to 48.4 grams of the DMF solution. The remainder of the DMF solution was cooled to room temperature and stored for later use and given the designation 032603a. The combined DMF solution and ~~Rubinate RUBINATE® M~~ mixture was vigorously stirred with a high speed mixer (about 2000 rpm) for approximately 5-20 seconds. The contents, which began to rise/foam at this point, was immediately transferred to a Pyrex dish where it was allowed to rise at ambient conditions. Once the foam was no longer tacky and was somewhat rigid (about 10 minutes), it was placed in a conventional 1200-watt microwave oven and cured on high for nine minutes. The resultant foam was bright yellow in color

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and extremely tough with a density of 0.35 pcf. DSC measurements of the resultant foam indicated full imidization of the material.

Please replace paragraph [0025] with the following amended paragraph:

[0025] Thirty (30) grams of solution 030403 from Example 1 and twenty-one (21) grams of Rubinate RUBINATE[®] M isocyanate were mixed together in a container at room temperature and vigorously stirred with a high speed mixer (about 2000 rpm) for approximately 5-20 seconds. The contents, which began to rise/foam at this point, was immediately transferred to a 473 ml closed ceramic mold where it was allowed to rise at ambient conditions. The foam was held in a closed mold at ambient conditions for approximately two and one half hours. (Approximately ten (10) grams of material squeezed out of the mold during the foaming process and six (6) grams were left in the mixing container.) At this point, the foamed product was removed from the mold and placed in a commercial 3000-watt microwave oven and cure at fifty (50) percent power for three minutes, followed by an additional three minutes at seventy (70) percent power, and then another three minutes at full power. The resultant foam of very good quality, dark yellow in color and tough with a density of 1.5 pcf. DSC measurements of the resultant foam indicated full imidization of the material.

Please replace paragraph [0027] with the following amended paragraph:

[0027] A first solution comprising PMDA, DMF, methanol, water, surfactant DC 193, catalyst ~~Dabco~~ DABCO K-15 catalyst and POLYCAT[®] BL 22 catalyst, ethylene glycol (E-600), and ~~fire-retardant Antiblaze~~ ANTIBLAZE N phosphorous-based fire retardant, as generally set forth in Example 1 was prepared and placed in a first storage tank. A second solution comprising methylene diisocyanate (MDI) was placed in a second storage tank. Two separate heatable hoses (capable of heating material flowing therethrough at a temperature of 200-250° F) were individually attached to the first and second storage tanks on first ends thereof, from which the first and second solutions were

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drawn by a pressure differential and transferred therethrough to a mixing chamber of a spraying system connected to the other ends of the heatable hoses. The first and second solutions were mixed in the air contained within the mixing chamber of the spraying system and applied at a pressure of 1200 psi – 1800 psi onto an article, whereupon they began to foam. The resulting exothermic reaction increased the temperature to a value high enough to cure the resulting foamed material. Hereby an article such as a marine vessel fuel tank is effectively protected. Moreover, any other intrinsic shape can be fully covered by foam and protected according to this embodiment of the present invention.

Please replace paragraph [0028] with the following amended paragraph:

[0028] Two hundred forty (240) grams of N,N-dimethyl formamide (DMF) was placed in a container. To the DMF was added twenty (20) grams of methanol, twenty (20) grams of water, thirty-four (34) grams of surfactant (DC 193), 0.06 grams of ~~catalyst~~ (DABCO K-15) catalyst, 0.03 grams of ~~catalyst~~ (POLYCAT BL 22) catalyst, 12.5 grams of ethylene glycol (E-600), and 8.6 grams of ~~phosphorous-based fire retardant (Antiblaze ANTIBLAZE N) phosphorous-based fire retardant~~. Once the solution had been mixed thoroughly, one hundred sixty eight (168) grams of pyromellitic dianhydride (PMDA) was added and an exothermic reaction occurred, raising the temperature of the solution by approximately 50°F. The solution was allowed to cool to approximately 100°F. Once cool, 27.4 grams of ~~Rubinate~~ RUBINATE® M isocyanate was added to 48.4 grams of the DMF solution. The remainder of the DMF solution was cooled to ~~RT~~ room temperature and stored for later use and given the designation 1-pot method. The combined DMF solution and ~~Rubinate~~ RUBINATE® M mixture was vigorously stirred with a high-speed mixer (about 2000 rpm) for approximately 5-20 seconds. The contents, which begin to rise/foam at this point, were immediately transferred to a Pyrex dish where it was allowed to rise at ambient conditions. Once the foam was no longer tacky and was somewhat rigid (about 10 minutes), it was placed in a conventional 1200-watt microwave oven and cured on high for nine minutes. The resultant foam was bright yellow in color and very

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tough with a density of 0.39 pcf. DSC measurements of the resultant foam indicated full imidization of the material.

Please replace paragraph [0029] with the following amended paragraph:

[0029] A solution consisting of twelve (12) grams of methanol, 6.7 grams of ethyl glycol butyl ether (EB), 18 grams of surfactant (DC 193), 4.1 grams of ~~phosphorous-based fire retardant (Antiblaze~~ ANTIBLAZE N) phosphorous based fire retardant, 9.2 grams of ethylene glycol (E-600), 10.5 grams of water, 120 grams of N,N-dimethyl formamide (DMF), and 0.05 grams of ~~catalyst (AS-102)~~ catalyst was prepared and stirred at room temperature. Then, 120 grams of pyromellitic dianhydride (PMDA) was slowly added to this combined solution. The addition of the PMDA into the solution was controlled such that the resultant exothermic reaction did not cause the solution temperature to exceed 190°F. A temperature of about 190°F was maintained during the stirring of the solution and the addition of PMDA. Once combined, the resultant solution was cooled to approximately 98°F. This solution was given the designation of Part B. Once cool, 132.6 grams of ~~Rubinate~~ RUBINATE® M isocyanate, given the designation Part A, was added to the solution. The Part B/ Part A mixture was vigorously stirred with a high-speed mixer for approximately 5-20 seconds. The contents, which begin to rise/foam at this point, was immediately transferred to an open mold where it was allowed to rise at ambient conditions. Once the foam was no longer tacky and was somewhat rigid (about 10 minutes), it was placed in a commercial microwave oven and cured. The resultant foam was bright yellow in color and very tough with a density of 0.34 pcf. Tables 1 and 2 display variations to Example 10 and the resultant change to the final foam density, with Table 1 displaying the variations in weight corresponding to the % variations in Table 2. The components that were varied are underlined. Thermal conductivity was measured by ASTM C-518 to be 0.334 Btu-in/hr-ft²-°F at room temperature.

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Please replace paragraph [0030] with the following amended paragraph:

[0030] A solution consisting of twelve (12) grams of methanol, 6.7 grams of ethyl glycol butyl ether (EB), 18 grams of surfactant (DC 193), 4.1 grams of ~~phosphorous-based fire retardant (Antiblaze~~ ANTIBLAZE N) ~~phosphorous based fire retardant~~, 9.2 grams of ethylene glycol (E-600), 10.5 grams of water, and 0.5 grams of catalyst (AS-102), was prepared and stirred at room temperature. A second solution consisting of 120 grams of N,N-dimethyl formamide (DMF) and 2 grams of 4, 4'-oxydianiline (ODA) was also prepared at RT room temperature. The first methanol solution was then added to the second DMF solution and stirred at room temperature RT. Then, 120 grams of pyromellitic dianhydride (PMDA) was slowly added to this combined solution. The addition of the PMDA into the solution was controlled such that the resultant exothermic reaction did not cause the solution temperature to exceed 190°F. A temperature of about 190°F was maintained during the stirring of the solution and the addition of PMDA. Once combined, the resultant solution was cooled to approximately 98°F. This solution was given the designation of Part B. Once cool, 133.5 grams of Rubinate RUBINATE[®] M isocyanate, given the designation Part A, was added to the solution. The Part B/ Part A mixture was vigorously stirred with a high-speed mixer for approximately 5-20 seconds. The contents, which begin to rise/foam at this point, were immediately transferred to an open mold where it was allowed to rise at ambient conditions. Once the foam was no longer tacky and was somewhat rigid (about 10 minutes), it was placed in a commercial microwave oven and cured. The resultant foam was bright yellow in color and very tough with a density of 0.40 pcf. Thermal conductivity was measure by ASTM C-518 to be 0.269 Btu-in/hr-ft²-°F at room temperature.

Please replace paragraph [0031] with the following amended paragraph:

[0031] A solution consisting of twelve (12) grams of methanol, 6.7 grams of ethyl glycol butyl ether (EB), 18 grams of surfactant (DC 193), 4.1 grams of ~~phosphorous-based fire retardant (Antiblaze~~ ANTIBLAZE N) ~~phosphorous based fire retardant~~, 9.2 grams of

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ethylene glycol (E-600), 10.5 grams of water, and 0.5 grams of ~~catalyst~~ (AS-102) catalyst was prepared and stirred at room temperature. A second solution consisting of 120 grams of N,N-dimethyl formamide (DMF) and 8 grams of 4, 4'-oxydianiline (ODA) was also prepared at ~~RT~~ room temperature. The first methanol solution was then added to the second DMF solution and stirred at ~~RT~~ room temperature. Then, 120 grams of pyromellitic dianhydride (PMDA) was slowly added to this combined solution. The addition of the PMDA into the solution was controlled such that the resultant exothermic reaction did not cause the solution temperature to exceed 190°F. A temperature of about 190°F was maintained during the stirring of the solution and the addition of PMDA. Once combined, the resultant solution was cooled to approximately 98°F. This solution was given the designation of Part B. Once cool, 136.1 grams of Rubinate RUBINATE® M isocyanate, given the designation Part A, was added to the solution. The Part B/ Part A mixture was vigorously stirred with a high-speed mixer for approximately 5-20 seconds. The contents, which begin to rise/foam at this point, were immediately transferred to an open mold where it was allowed to rise at ambient conditions. Once the foam was no longer tacky and was somewhat rigid (about 10 minutes), it was placed in a commercial microwave oven and cured. The resultant foam was bright yellow in color and very tough with a density of 0.51 pcf.

Please replace paragraph [0033] with the following amended paragraph:

[0033] A solution consisting of twelve (12) grams of methanol, 6.7 grams of ethyl glycol butyl ether (EB), 18 grams of surfactant (DC 193), 4.1 grams of ~~phosphorous-based fire retardant (Antiblaze~~ ANTIBLAZE N) phosphorous based fire retardant, 9.2 grams of ethylene glycol (E-600), 10.5 grams of water, and 0.5 grams of ~~catalyst~~ (AS-102) catalyst was prepared and stirred at room temperature. A second solution consisting of 120 grams of N,N-dimethyl formamide (DMF) and 8 grams of 4, 4'-oxydianiline (ODA) was also prepared at ~~RT~~ room temperature. The first methanol solution was then added to the second DMF solution and stirred at ~~RT~~ room temperature. Then, 161 grams of 3,3',4,4'-biphenyltetracarboxylic dianhydride (BPDA) was slowly added to this

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combined solution. The addition of the BPDA into the solution was controlled such that the resultant exothermic reaction did not cause the solution temperature to exceed 190°F. A temperature of about 190°F was maintained during the stirring of the solution and the addition of BPDA. Once combined, the resultant solution was cooled to approximately 98°F. This solution was given the designation of Part B. Once cool, 154.2 grams of Rubinate RUBINATE® M isocyanate, given the designation Part A, was added to the solution. The Part B/ Part A mixture was vigorously stirred with a high-speed mixer for approximately 5-20 seconds. The contents, which begin to rise/foam at this point, were immediately transferred to an open mold where it was allowed to rise at ambient conditions. Once the foam was no longer tacky and was somewhat rigid (about 10 minutes), it was placed in a commercial microwave oven and cured. The resultant foam was bright yellow in color and very tough with a density of approximately 0.48 pcf.

Please replace paragraph [0034] with the following amended paragraph:

[0034] A solution consisting of twelve (12) grams of methanol, 6.7 grams of ethyl glycol butyl ether (EB), 18 grams of surfactant (DC 193), 4.1 grams of ~~phosphorous based fire retardant~~ (Antiblaze ANTIBLAZE N) ~~phosphorous based fire retardant~~, 9.2 grams of ethylene glycol (E-600), 10.5 grams of water, and 0.5 grams of ~~catalyst~~ (AS-102) catalyst was prepared and stirred at room temperature. A second solution consisting of 120 grams of N,N-dimethyl formamide (DMF) and 4.3 grams of m-phenylene diamine (m-PDA) was also prepared at ~~RT~~ room temperature. The first methanol solution was then added to the second DMF solution and stirred at ~~RT~~ room temperature. Then, 120 grams of pyromellitic dianhydride (PMDA) was slowly added to this combined solution. The addition of the PMDA into the solution was controlled such that the resultant exothermic reaction did not cause the solution temperature to exceed 190°F. A temperature of about 190°F was maintained during the stirring of the solution and the addition of PMDA. Once combined, the resultant solution was cooled to approximately 98°F. This solution was given the designation of Part B. Once cool, 134.5 grams of Rubinate RUBINATE® M isocyanate, given the designation Part A, was added to the solution. The Part B/ Part A

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mixture was vigorously stirred with a high-speed mixer for approximately 5-20 seconds. The contents, which begin to rise/foam at this point, were immediately transferred to an open mold where it was allowed to rise at ambient conditions. Once the foam was no longer tacky and was somewhat rigid (about 10 minutes), it was placed in a commercial microwave oven and cured. The resultant foam was bright yellow in color and very tough with a density of approximately 0.48pcf.

Please replace paragraph [0035] with the following amended paragraph:

[0035] A solution consisting of twelve (12) grams of methanol, 6.7 grams of ethyl glycol butyl ether (EB), 18 grams of surfactant (DC 193), 4.1 grams of ~~phosphorous based fire retardant (Antiblaste~~ ANTIBLAZE N) ~~phosphorous based fire retardant~~, 9.2 grams of ethylene glycol (E-600), 10.5 grams of water, and 0.5 grams of ~~catalyst (AS-102)~~ catalyst was prepared and stirred at room temperature. A second solution consisting of 120 grams of N,N-dimethyl formamide (DMF) and 8 grams of 4, 4'-oxydianiline (ODA) was also prepared at room temperature. The first methanol solution was then added to the second DMF solution and stirred at room temperature. Then, 120 grams of pyromellitic dianhydride (PMDA) was slowly added to this combined solution. The addition of the PMDA into the solution was controlled such that the resultant exothermic reaction did not cause the solution temperature to exceed 190°F. A temperature of about 190°F was maintained during the stirring of the solution and the addition of PMDA. Once combined, the resultant solution was cooled to approximately 98°F. This solution was given the designation of Part B. Once cool, 89 grams of ~~Rubinate~~ RUBINATE® TDI isocyanate, given the designation Part A, was added to the solution. The Part B/ Part A mixture was vigorously stirred with a high-speed mixer for approximately 5-20 seconds. The contents, which begin to rise/foam at this point, were immediately transferred to an open mold where it was allowed to rise at ambient conditions. Once the foam was no longer tacky and was somewhat rigid (about 10 minutes), it was placed in a commercial microwave oven and cured. The resultant foam was bright yellow in color and very tough with a density of approximately 0.48pcf.

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Please replace paragraph [0036] with the following amended paragraph:

[0036] A solution consisting of twelve (12) grams of methanol, 6.7 grams of ethyl glycol butyl ether (EB), 18 grams of surfactant (DC 193), 4.1 grams of ~~phosphorous-based fire retardant (Antiblaze~~ ANTIBLAZE N) phosphorous based fire retardant, 9.2 grams of ethylene glycol (E-600), 10.5 grams of water, and 0.5 grams of ~~catalyst (AS-102)~~ catalyst was prepared and stirred at room temperature. A second solution consisting of 120 grams of N,N-dimethyl formamide (DMF) and 8 grams of 4, 4'-oxydianiline (ODA) was also prepared at room temperature. The first methanol solution was then added to the second DMF solution and stirred at room temperature. Then, 120 grams of pyromellitic dianhydride (PMDA) was slowly added to this combined solution. The addition of the PMDA into the solution was controlled such that the resultant exothermic reaction did not cause the solution temperature to exceed 190°F. A temperature of about 190°F was maintained during the stirring of the solution and the addition of PMDA. Once combined, the resultant solution was cooled to approximately 98°F. This solution was given the designation of Part B. Once cool, 128 grams of Rubinate RUBINATE[®] 44 (pure methylene diisocyanate, MDI), given the designation Part A, was added to the solution. The Part B/ Part A mixture was vigorously stirred with a high-speed mixer for approximately 5-20 seconds. The contents, which begin to rise/foam at this point, were immediately transferred to an open mold where it was allowed to rise at ambient conditions. Once the foam was no longer tacky and was somewhat rigid (about 10 minutes), it was placed in a commercial microwave oven and cured. The resultant foam was bright yellow in color and very tough with a density of approximately 0.48pcf.